Conflict of interest

The authors declare no conflict of interest.

Acknowledgments

None.

References

[1] Hashida Y, Wada T, Saito T, Ohta K, Kasahara Y, Yachie A. Early diagnosis of Danon disease: Flow cytometric detection of lysosome-associated membrane protein-2-negative leukocytes. J Cardiol 2014. http://dx.doi.org/10.1016/j.jjcc.2014.09.011.
[2] Fanin M, Nascimbeni AC, Fulizio L, Spinazzi M, Melacini P, Angelini C. Generalized lysosome-associated membrane protein-2 defect explains multisystem clinical involvement and allows leukocyte diagnostic screening in Danon disease. Am J Pathol 2006;168:1309–20.
[3] Regelsberger G, Hoftberger R, Pickl WF, Zlabinger GJ, Kormoczi U, Salzer-Muhar U, Luckner D, Bodamer OA, Mayr JA, Muss WH, Budka H, Bernheimer H. Danon disease: Case report and detection of new mutation. J Inherit Metab Dis 2009;32:115–22.
[4] Majer F, Vlaskova H, Krol L, Kalina T, Kubanek M, Stolnaya L, Dvorakova L, Elleder M, Sikora J. Danon disease: A focus on processing of the novel LAMP2 mutation and comments on the beneficial use of peripheral white blood cells in the diagnosis of LAMP2 deficiency. Gene 2012;498:183–95.
[5] Majer F, Pelak O, Kalina T, Vlaskova H, Dvorakova L, Honzik T, Palecek T, Kuchynka P, Masek M, Zeman J, Elleder M, Sikora J. Mosaic tissue distribution of the tandem duplication of LAMP2 exons 4 and 5 demonstrates the limits of Danon disease cellular and molecular diagnostics. J Inherit Metab Dis 2014;37:117–24.
[6] Teplitz RL, Beutler E. Mosaicism, chimerism and sex-chromosome inactivation. Blood 1966;27:258–71.

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Received 11 December 2014
Available online 27 January 2015

http://dx.doi.org/10.1016/j.jjcc.2014.12.014

Author's reply

Danon disease is an X-linked myopathy that was first reported by Danon et al. in 1981 as a "Lysosomal glycogen storage disease with normal acid maltase" [1]. The disease is characterized by three major symptoms, cardiomyopathy, muscle weakness, and mild mental retardation, and has a wide spectrum of clinical features. Although male patients usually develop severe symptoms, female patients tend to be severely affected in case of cardiomyopathy. Moreover, the frequency of Danon disease has recently been suggested to be higher than originally considered. Therefore, a method is needed that can easily diagnose Danon disease before onset, regardless of the family history or gender.

In 2008, we experienced a case of a 13-year-old boy with Danon disease. During the diagnosis of this case, the validity of a flow cytometry method was confirmed, and the subsequent screening of the proband's family demonstrated that the method was applicable for diagnosing a presymptomatic case of Danon disease in a female patient. This is the first report that demonstrated the validity of a flow cytometry method for intra-family search of Danon disease within the affected family and successful screening of a presymptomatic case [2]. This result indicates that the method is a useful screening technique for searching the cause of cardiomyopathy of unknown etiology. However, a critical reference was not cited in this study report [3]. This was simply caused by an overlook that occurred between the diagnosis of the proband (2008) and the final acceptance of the manuscript by the *Journal of Cardiology*; that is, after completion of the project, the manuscript went through several review processes by multiple journals and the error occurred during this process. We sincerely apologize for our carelessness.

The purpose of this article is not to discuss the genetic background of a case in which genetic abnormalities were not identified by a standard genetic test in the mother of the child with the X-linked Danon disease or a case where identification was challenging even with our flow cytometry method. In addition, it remains unknown whether females with mosaicism consistently show the phenotype of Danon disease. As suggested, a detailed examination of the genotype of the mother is essential to elucidate the pathology; however, this is beyond the scope of this project. Nevertheless, it does not change the fact that this method is useful for diagnosing myopathy that has already developed or for diagnosing a presymptomatic heterozygous female with Danon disease who has a definite chance of developing the symptom in the future. This is the first study that demonstrated the validity of this method.

Although the mother was described to have "chimerism", "mosaicism" is the correct term as suggested and we have revised it accordingly.

References

[1] Danon MJ, Oh SJ, DiMauro S, Manaligod JR, Eastwood A, Naidu S, Schliselfeld LH. Lysosomal glycogen storage disease with normal acid maltase. Neurology 1981;31:51–7.
[2] Hashida Y, Wada T, Saito T, Ohta K, Kasahara Y, Yachie A. Early diagnosis of Danon disease: flow cytometric detection of lysosome-associated membrane protein-2-negative leukocytes. J Cardiol 2014. http://dx.doi.org/10.1016/j.jjcc.2014.09.011, pii:S0914-5087(14)00287-1.
[3] Majer F, Pelak O, Kalina T, Vlaskova H, Dvorakova L, Honzik T, Palecek T, Kuchynka P, Masek M, Zeman J, Elleder M, Sikora J. Mosaic tissue distribution of the tandem duplication of LAMP2 exons 4 and 5 demonstrates the limits of Danon disease cellular and molecular diagnostics. J Inherit Metab Dis 2014;37:117–24.

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Received 23 January 2015
Available online 10 March 2015

http://dx.doi.org/10.1016/j.jjcc.2015.01.005